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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/779,287	02/08/2001	George Ernest Morris	37,248-04	6598

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BP Amoco Corporation
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EXAMINER	
GRIFFIN, WALTER DEAN	
ART UNIT	**PAPER NUMBER**
1764	

DATE MAILED: 09/30/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/779,287	Applicant(s) MORRIS ET AL.	
	Examiner Walter D. Griffin	Art Unit 1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 September 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 February 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The expression "the high-boiling oxidation feedstock" in the last line of claim 21 lacks proper antecedent basis.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-15, 17-19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al. (6,217,748) in view of Yen et al. (6,402,939) and Ford et al. (3,341,448).

The Hatanaka reference discloses a process in which a sulfur-containing gas oil is hydrotreated to remove sulfur compounds. This gas oil would necessarily have an API gravity within the claimed range. This hydrotreating is conducted in the presence of a hydrotreating catalyst. The resulting hydrotreated feed is separated into a light fraction and a heavy fraction. The cut point temperature for separation of the fractions is in the range of 300 to 350°C. The light fraction is essentially free of sulfur whereas the heavy fraction must be further desulfurized to remove, for example, dibenzothiophene compounds. Following this further desulfurization, the light and heavy fraction are blended to produce a fuel. See col. 2, lines 65-67; col. 3, lines 1-11 and 26-56; col. 4, lines 11-67; col. 5, lines 1-23 and 65-67; and col. 6, lines 1-10.

The Hatanaka reference does not disclose desulfurization of the heavy fraction by contacting it with a quaternary ammonium salt, hydrogen peroxide, and acid.

The Yen reference discloses a process for removing sulfur compounds such a dibenzothiophene and derivatives thereof from a hydrocarbon stream. The process comprises contacting the hydrocarbon stream with water, hydrogen peroxide, phosphotungstic acid, and a quaternary ammonium salt that has the same formula as claimed. Quaternary ammonium halides are preferred. The product resulting from the contacting can be phase separated to produce an

organic phase and an aqueous phase. The sulfones produced by the process can be removed from the organic phase by adsorption using silica or polymeric resins or by liquid-liquid extraction. The reaction medium is cooled by a coolant that is at a temperature of about 50°C or less. See col. 2, lines 41-48; col. 3, line 28 through col. 4, line 65; and col. 6, line 1 through col. 7, line 39.

The Ford reference discloses that the degree of desulfurization achieved by successive oxidative and hydrodesulfurization stages is significantly higher than that achieved by either two successive oxidative desulfurization stages or two successive hydrodesulfurization stages and that the improvement is independent of the order of the stages. See col. 3, lines 13-30.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Hatanaka by substituting the desulfurization process of Yen for the second desulfurization of Hatanaka because the desulfurization of Yen is effective for removing sulfur compounds removed by the second desulfurization of Hatanaka. Additionally, as disclosed by Ford, combining the first hydrodesulfurization of Hatanaka with the oxidative desulfurization of Yen would result in the expectation that a significantly higher degree of desulfurization would be achieved than is achieved by the two successive hydrodesulfurization stages disclosed by Hatanaka.

Regarding the recycle of the aqueous phase, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the references by recycling the aqueous phase because material costs will be reduced by recycling thereby improving the economics of the process.

Regarding the presence of nitrogen in the feed, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the references by

utilizing a feed that also contains nitrogen compounds because one would expect the sulfur compounds to be effectively oxidized regardless of the presence of nitrogen.

Claims 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatanaka et al. (6,217,748), Yen et al. (6,402,939), and Ford et al. (3,341,448) as applied to claims 15 and 17 above, and further in view of Noble et al. (2,749,284).

None of the previously discussed references discloses the solvents of claim 16 or the basic solution of claim 20.

The Noble reference discloses that oxidized sulfur compounds can be removed from mineral oils by extraction using methanol or strong caustic soda solutions (i.e., sodium hydroxide solutions). See col. 2, lines 45-56.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the previously discussed references by treating the organic phase with either methanol or sodium hydroxide solutions as suggested by Noble because effective removal of oxidized sulfur compounds would be expected.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art not relied upon discloses desulfurization processes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter D. Griffin whose telephone number is 703-305-3774. The examiner can normally be reached on Monday-Friday 6:30 to 4:00 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode can be reached on 703-308-4311. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.

Walter D. Griffin
Primary Examiner
Art Unit 1764

WG
September 26, 2002